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ABSTRACT

Monitoring international goals on land ownership and rights relies fundamentally on the quality of underlying data, which, in the context of surveys, are directly impacted by how respondents are selected. This study leverages two national surveys in Malawi that asked households about household members' ownership and rights of agricultural land, but which differed in their approach to respondent selection. Compared with the international best practice of privately interviewing adults about their personal asset ownership and rights, the analysis reveals that the business-as-usual approach of interviewing only a most knowledgeable household member on adult members' ownership and rights of agricultural land leads to (i) a higher share of men claiming exclusive reported and economic ownership, and (ii) a lower share of women claiming joint reported and economic ownership. Using private interviews of spouses' ownership and rights over the same set of parcels, the analysis also shows that when conflicting claims emerge, proxies for greater household status for women are positively associated with scenarios where women attribute at least some land ownership to themselves.

1. Introduction

Individual ownership and control over assets — such as land, housing, financial accounts, and durables — can ease access to credit; help boost productivity and income; provide security amid income shocks; and improve bargaining power and decision-making within households (Carter and Barrett, 2006; Doss, 2013). Accurate information on intra-household asset ownership and control can therefore play an important role in policymaking, including the design of land reforms and initiatives on economic empowerment. Understanding gender differences in asset ownership and wealth, for example, can reveal the extent of economic disadvantage accumulated by women over the life cycle and its inter-generational implications in a stratified social system, providing a longer-term overview of the gender dimensions of economic inequality and vulnerability (Oduro and Doss, 2018; Ruel and Hauser, 2013; Warren, 2006). Additionally, in contexts where formal documentation is limited and local customs determine how land holdings are managed within households and are assigned to individuals, a more disaggregated view of different types of ownership (legal versus economic, for example) and rights (selling or bequeathing, for example) is needed (Kilic and Moylan, 2016; Kang et al., 2020; Slavchevska et al., 2020).

These issues are particularly relevant for agriculture in developing-country contexts (Deininger et al., 2021), where a clearer understanding of individual land ownership and rights can help raise productivity and secure property rights among farmers. This is especially important for raising economic opportunities among more vulnerable groups, including smallholder or landless farmers that make up a large share of the agricultural employed, as well as women, who face substantial inequalities in ownership and rights over land,[1] and play important but often less-observable roles in smallholder farming, as well as contributing family work/unremunerated labor on family farms (see Koolwal, 2019, for a review).

Against this backdrop, household survey-based, sex-disaggregated indicators on individual land ownership and rights have been endorsed as part of the monitoring of the specific targets

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[1] This is underscored by the Sustainable Development Goal Target 2.3: "By 2030, double the agricultural productivity and the incomes of small-scale food producers, particularly women [. . .], including through secure and equal access to land [. . .]."

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under Sustainable Development Goals (SDGs)[2]. Survey data on these topics, however, have traditionally been fraught with two key shortcomings. First, ownership- and rights-related information are often collected at the household level, obscuring an understanding of asset ownership and rights among household members. As a result, (confounded) conclusions regarding the gender asset gap would be (and have been) anchored in the comparison of men- versus women-headed households.[3] Second, even when reported, documented and/or economic owners and rights holders are identified for specific assets[4], the information is often provided by a "most knowledgeable" household member, who may not necessarily have accurate information on household members' asset ownership and rights.[5] The profile of most knowledgeable household members can vary across different contexts.[6]

Recently, international momentum behind improving the availability and quality of individual-disaggregated survey data on asset ownership and control has accelerated. In 2014, the United Nations Evidence and Data for Gender Equality (EDGE) initiative, together with the World Bank Living Standards Measurement Study (LSMS), supported the implementation and analysis of the Methodological Experiment on Measuring Asset Ownership from a Gender Perspective (MEXA) (Kilic and Moylan, 2016), a randomized survey experiment that field-tested five approaches to respondent selection while collecting data on individual ownership of and rights to assets in Uganda. [7]MEXA findings in turn informed the design of the EDGE-supported country pilots that were subsequently implemented by the national statistical offices across Georgia, Maldives, Mexico, Mongolia, the Philippines and South Africa. These activities ultimately culminated in the United Nations Guidelines for Producing Statistics on Asset Ownership from a Gender Perspective (UNSD, 2019), which were in turn operationalized in national household surveys supported by the World Bank Living Standards Measurement Study – Plus (LSMS +) program to improve the availability and quality of individual-disaggregated survey data on key dimensions of economic opportunity, including specific modules on health, education, labor and asset ownership.[8]

The UN guidelines, consistent with the previous work by Grown et al. (2005) and Doss et al. (2011), provide empirical evidence in support of (i) reducing the reliance on most knowledgeable household member(s) in collecting individual-disaggregated survey data on asset ownership and rights, (ii) expanding the practice of interviewing multiple adults per household (in fact interviewing either all adults or one randomly selected adult for collecting the required data for the SDG 5.a.1), and (iii) probing directly and solely regarding respondents' personal asset ownership and rights, either exclusively or jointly with someone else. Evidence from MEXA shows these recommendations, when implemented, provide a more complete picture of ownership and rights to assets within households, particularly among women; minimize both distortionary proxy respondent effects and intra-household discrepancies in reporting; and reveal hidden assets (Kilic and Moylan, 2016).

This paper compares reporting of agricultural land ownership and rights across two national surveys in Malawi that were conducted in parallel by the Malawi National Statistical Office and that differed in their approach to respondent selection. While the Malawi Fourth Integrated Household Survey 2016/17 (IHS4) employed the business-as-usual approach of interviewing the most knowledgeable household member(s)[9] to obtain information on household members' ownership and rights over selected physical and financial assets, the Integrated Household Panel Survey 2016 (IHPS) was the first nationally representative multi-topic household survey attempting to operationalize the aforementioned UN guidelines on conducting intra-household, private interviews with adults about their personal asset ownership and rights. The IHPS, in particular, is part of the World Bank LSMS Plus (LSMS +) initiative.

The concurrent implementation of the IHS4 and the IHPS offers an opportunity to assess the effects of conducting best-practice individual-level interviews vis-à-vis the business-as-usual approach on the measurement of asset ownership and rights among adult household members. Against a background of earlier studies that have sought similar objectives with sub-national survey data, the key contribution of our paper, with a focus specifically on agricultural land, is to provide the first set of evidence on the importance of conducting individual-level interviews on asset ownership and rights in national household surveys — those that the UN guidelines seek to influence, and which researchers use to study relationships between agricultural land ownership/rights and agricultural investment, productivity and welfare outcomes (Deininger et al., 2021). The multi-topic nature of our survey data also allows us to look at the heterogenous impacts of individual-level interviews in different population sub-groups, in accordance

[2] These include the SDG 1.4.2 indicator: the proportion of total adult population with secure tenure rights to land, [. . .] by sex [. . .], and the SDG 5.a.1 indicators: (a) the proportion of total agricultural population with ownership or secure rights over agricultural land, by sex; and (b) the share of women among owners or rights-bearers of agricultural land.

[3] These households have different socioeconomic and demographic compositions, with women being more likely to be living in men-headed households than men living in women-headed households (Beegle and van de Walle, 2019).

[4] Following the 2008 System of National Accounts, the reported owner of assets is the legal owner, and the economic owner is entitled to claim the benefits associated with the use of the asset in economic activity, by virtue of accepting the associated risks with that activity (UN, 2017). For agricultural land, an individual is identified as a documented owner if they are reported to be listed on an offer of lease, title deed, or certificate of lease for at least one agricultural parcel. As discussed further in the paper, these types of ownership typically overlap.

[5] Examples include: (i) earlier rounds of the Living Standards and Measurement Study (LSMS) surveys (see Doss et al. (2008) for an examination of LSMS surveys up to 2007, and Deere et al. (2012) for an analysis of LSMS surveys in Latin America and the Caribbean), (ii) the American Housing Survey and U.S. Survey of Consumer Finances; and (iii) the European Central Bank Household Finance and Consumption Survey.

[6] Being selected as the most knowledgeable respondent may commonly be linked with headship, but this depends on household structure and local norms around family and access to economic opportunities. Women who are designated as household heads in developing country contexts are often either widowed or with a spouse that is living or working elsewhere (Klasen et al., 2015). In married-couple households, men are often designated as household heads (and, in turn, as the most knowledgeable respondent) in contexts with patriarchal norms and where men have greater access to economic opportunities (Bardasi et. al, 2011). Although surveys do not always identify the most knowledgeable household member chosen as a respondent for a given module, we do leverage the data from the Malawi Fourth Integrated Household Survey (IHS4) 2016/17 later in this paper to offer a descriptive profile of the most knowledgeable respondents in that setting.

[7] MEXA targeted 140 enumeration areas (EAs) across Uganda, and randomly allocated four households in each EA to each of five treatments/arms that differed in terms of respondent selection. Regardless of the treatment, the respondent(s) were interviewed alone. The first four treatments/arms included interviewing (1) the self-identified most knowledgeable household member; (2) a randomly selected member of the principal couple; (3) the principal couple together; (4) all adult household members, simultaneously. In Arms 1–4, the respondents reported on all assets owned, either exclusively or jointly, by any household member. Arm 5 was identical to Arm 4, except that respondents reported only on assets they themselves owned, either exclusively or jointly. The asset types included: dwelling, agricultural land, livestock, agricultural equipment, other real estate, non-farm enterprise assets, financial assets, and valuables. Documented, reported, and economic ownership and the rights to sell, rent out, use as collateral, bequeath, and make investments were differentiated at the asset-level. Individuals associated with each of these constructs were uniquely identified. See Kilic and Moylan (2016) for more information on the design and implementation of MEXA.

[8] Over the period of 2016–2021, the thematic focus of the LSMS+ program is asset ownership, work and employment, and entrepreneurship. The national household surveys supported by the World Bank LSMS+ initiative include the Cambodia LSMS+ Survey (piggybacked on the Cambodia Socioeconomic Survey (CSES) 2019/20), Ethiopia Socioeconomic Survey (ESS) 2018/19, Malawi Integrated Household Panel Survey (IHPS) 2016, Sudan Labor Market Panel Survey (SLMPS) 2021 and Tanzania National Panel Survey (TZNPS) 2019/20. For more information, please visit: www.worldbank.org/lsmsplus.

[9] The identity of these individuals is known in the IHS4 data.

with age, marital status, education and rural/urban residence, among others.

Overall, our findings support privately interviewing multiple household members. In the IHS4, 67 percent of women live in male-headed households, and 70 percent in the IHPS, reinforcing the importance of looking within households to better understand gender asset gaps.[10] Malawi is a unique context, where women's land ownership often exceeds men's ownership, due to strong matrilineal traditions where family land is passed through the female line. Simple comparisons reveal that women's land ownership is, on the whole, higher than men's in both the IHS4 and IHPS, although headship does matter — exclusive reported ownership and rights among women who are not household heads are significantly lower than for men in the IHS4, while these gaps close in the IHPS.

After controlling for relevant individual, household, and community attributes, as well as enumerator and interview month fixed effects in our regressions, we find the share of men claiming exclusive reported and economic ownership of agricultural land is higher in the IHS4 than in the IHPS (driven mainly by a positive association between land ownership and male headship), while the shares of women claiming joint reported and economic ownership of agricultural land are lower in the IHS4. For rights to sell and bequeath, on the other hand, the business-as-usual approach leads to an increase for both men and women, and a surge in the estimate of SDG indicator 5.a.1, driven by a positive effect on reporting of joint rights.

Conducting intra-household, private interviews with adult household members does come with greater costs and measurement complexities, including the possibility that household members may not agree on who owns and/or has rights to a particular land parcel (Kilic and Moylan, 2016). From a gender perspective, these reporting discrepancies can in fact affect our understanding of how asset ownership/rights and women's status and empowerment are linked (Ambler et al., 2019; Annan et al., 2021; Doss et al., 2015). We find that the individual interview approach in the IHPS reveals relative consistency in spouses' reporting over land ownership and rights. Where present, however, the information arising from discrepancies in reporting can point to a distinct, additional reason why individual interviews are meaningful in understanding empowerment. Specifically, in the IHPS, we find that proxies for greater household status for women (including age, matrilineal marriage and, in particular, being the main decision-maker over crops) are positively associated with the discrepancy scenarios where the woman attributes at least some parcel ownership to herself.

The paper is organized as follows. Section 2 covers the country context and data. Section 3 lays out the empirical strategy. Section 4 presents the results, and Section 5 concludes.

2. Country context and data

2.1. Agriculture and land in Malawi

Malawi is a small, landlocked country in southeast Africa, with an absolute poverty rate of 51.5 percent. Agriculture makes up 26 percent of GDP, and 83 percent of households are economically active in agriculture, among whom 93 percent live in rural areas (Davis et al., 2017). Much of agricultural production is subsistence, however — the average value of crop sales as a share of the value of overall crop production stands at 18 percent (Carletto et al., 2017), and the sector is characterized by low productivity and land shortages (World Bank, 2019).

Land in Malawi is typically allocated through customary practices at the community and family levels, affecting agricultural decision-making and related outcomes (Restuccia, Diego and Raul Santaeulalia-Llopis, 2017). Inheritance of land within families continues to depend strongly on whether the household is matrilineal or patrilineal (Berge et al., 2014). As part of the IHS4 and the IHPS, 56 and 58 percent of households, respectively, were matrilineal, where land is handed down through the female line, and matrilineal marriages are also much more prevalent in southern Malawi (see Berge et al., 2014, and Andersson Djurfeldt et al., 2018, for a discussion of matrilineal traditions and land ownership and decision-making in Malawi). Due to these customs, women's land ownership in Malawi is high compared to other countries — and as we see later in the data, can surpass men's land ownership for specific groups. Malawi's 2016 Customary Land Act also supports women's customary land rights, although, through the Act's mechanisms of using local leaders to resolve land disputes and allocate land, women can face practical difficulties in securing rights (Deininger et al., 2017) and having input in decision-making over the management of agricultural parcels (Andersson Djurfeldt et al., 2018).

2.2. IHS4 and IHPS: Varying approaches to respondent selection for collecting data on asset ownership, with a focus on land[11]

The Fourth Integrated Household Survey (IHS4) 2016/17, a multi-topic, cross-sectional, nationally representative survey of 12,480 households, followed the approach of surveying the "most knowledgeable" household member(s) to provide information on household members' ownership and rights to selected physical and financial assets, namely dwelling (including the residential plot), agricultural parcels, and financial accounts. This approach corresponds to Treatment Arm 1 ("T1") of the Uganda MEXA study (Kilic and Moylan, 2016), and is designated as T1/IHS4 henceforth. In line with the prevailing implementation protocols, the selection of the most knowledgeable household member(s) was also a function of the adult individuals that were available at the time of the interview. This could have meant, for example, that the first choice for the most knowledgeable member was not interviewed if he/she was unavailable when the field team was visiting that enumeration area (EA). For agricultural land specifically, a roster of all owned and/or cultivated agricultural parcels was created first, and the enumerator was instructed to interview the most knowledgeable household member for each parcel.[12]

On the other hand, the Integrated Household Panel Survey (IHPS) 2016 was the third wave of a multi-topic, longitudinal household survey of 2,508 households that have been followed since 2010. The IHPS 2016 was also the first nationally representative multi-topic household survey to follow the UN Guidelines. As part of the LSMS + program, the IHPS aimed to interview each adult household member in private regarding their personal ownership and rights over different asset classes, including the dwelling and the residential parcel, agricultural parcels, financial accounts, and mobile phones. This approach corresponds to Treatment Arm 5

[10] For men, this share was about 89 percent across both the IHS4 and the IHPS.

[11] The data, questionnaires and basic information document for the IHS4 2016/17 can be accessed here: https://microdata.worldbank.org/index.php/catalog/2936. The data, questionnaires and basic information document for the IHPS 2016 can be accessed here: https://microdata.worldbank.org/index.php/catalog/2939. Both the IHS4 2016/17 and the IHPS 2016 were implemented with technical and financial assistance from the World Bank Living Standards Measurement Study – Integrated Surveys on Agriculture (LSMS-ISA), using the Surveys Solutions Computer-Assisted Personal Interviewing (CAPI) platform. The implementation of the individual interviews as part of the IHPS 2016 was made possible by technical and financial assistance from the World Bank LSMS+ Program.

[12] In 90 percent of the T1/IHS4 households with multiple parcels, the respondent was the same for all the parcels.

("T5") of the Uganda MEXA study (Kilic and Moylan, 2016), and is designated as T5/IHPS henceforth.[13] On dwelling (inclusive of the residential parcel) and agricultural parcels, the T5/IHPS administered adapted versions of the MEXA questionnaire modules, inquiring directly regarding the respondents' personal — exclusive as well as joint — ownership and rights. In contrast, the T1/IHS4 followed the traditional (i.e. business-as-usual) approach of interviewing the most knowledgeable household member(s) to provide information on household members' ownership and rights over the same set of assets.

Appendix I includes the protocol for administering the T5/IHPS individual questionnaire. The individual interviews were capped at four per household and it was ensured that the head of household and his/her spouse (if one exists) were among the interviewed individuals.[14] Within-household interviews were always administered in private and were attempted to be administered simultaneously and with a gender match-up between the enumerator and respondent.[15] In line with the UN EDGE Recommendations, regarding agricultural land, following the creation of a roster of all owned and/or cultivated agricultural parcels and the identification of those that are "owned" by at least one household member, this common list of owned parcels that is generated as part of the household interview was fed forward to each individual interview in that household.[16,17]

Furthermore, the focus on "personal" ownership and rights over land in the T5/IHPS meant that there were differences between the two surveys in the phrasing of a range of questions on:

(i) **reported** ownership (i.e. *Who in this household owns this [PARCEL]?* in the T1/IHS4 versus *Are you among the owners of this [PARCEL]?* in the T5/IHPS);
(ii) **economic** ownership (i.e. *If this [PARCEL] were to be sold/rented out today, who would decide how the money is used?* in the T1/IHS4 versus *If this [PARCEL] were to be sold/rented out today, would you be among the individuals to decide how the money is used?* in the T5/IHPS);[18]
(iii) **documented** ownership (i.e. Who is listed on the title or ownership document as owner of this [PARCEL]? in the T1/IHS4 versus *Is your name among the names listed on the ownership document for this [PARCEL]?* in the T5/IHPS), and
(iv) right to **sell** (i.e. *Does anyone in the household have the right to sell this [PARCEL]?,* followed by *Who can decide whether to sell this [PARCEL]?* in the T1/IHS4 versus *With regard to this [PARCEL], are you among the individuals who have the right to sell it, even if you need to obtain consent or permission from someone else?* in the T5/IHPS); and
(v) right to **bequeath** (i.e. *Does anyone in the household have the right to bequeath this [PARCEL],* followed by *Who can decide whether to sell this [PARCEL]?* in the T1/IHS4 versus *With regard to this [PARCEL], are you among the individuals who have the right to bequeath it, even if you need to obtain consent or permission from someone else?* in the T5/IHPS).[19,20]

The combination of questions on documented ownership and rights to sell and bequeath allow us to compute a binary ownership variable that underlies the computation of the SDG Indicator 5.a.1: the proportion of total agricultural population with ownership or secure rights over agricultural land, by sex.

On joint versus exclusive ownership, the T1/IHS4 allowed for the most knowledgeable respondent to specify up to 4 household members and 2 non-household members as joint parcel owners/right holders in the answers to these questions. On the other hand, the T5/IHPS asked each self-reporting owner/right holder a follow-up question to identify the presence of joint owners/right holders, and if applicable, specify up to 3 household members and 2 non-household members as joint owners/right holders.

Finally, another key difference between the surveys was about the land rights-related data collection. In the T5/IHPS, the questions on rights to sell and bequeath were not administered to the individual respondent if he/she did not name himself/herself as a reported owner for a given parcel. Conversely, in the T1/IHS4, the parcel-level questions on rights to sell and bequeath were administered irrespective of the answers given to the question on reported ownership of that parcel. Since the reported ownership question in the T1/IHS4 is phrased to refer to any individual, rather than respondent himself/herself (the most knowledgeable household member in this case), and is aimed at identifying all owners associated with a given parcel, it is virtually impossible to enable the latter questions on the rights to sell and bequeath as a function of the answers given to the earlier question on reported ownership.

In terms of success of implementation, among the 2,508 T5/IHPS households, 98.7 percent completed at least one individual interview.[21] While all (5,089) eligible adults were targeted for interviews, the non-response rate was 18 percent on the whole, 24 percent for adult men and 12 percent for adult women.[22] As discussed below, we follow a regression-based approach to compute response weights for the T5/IHPS sample that is used for analysis. The model controls for a range of individual- and household-level

[13] The T5/IHPS questionnaire was the Malawi-adapted version of the MEXA T5 questionnaire, with the additions regarding the initial roster of parcels that is created as part of the household interview and that is fed forward into individual interviews in that household – in line with the recommendations of UNSD (2019).

[14] This was an upper limit that only applied to 1 percent of the sampled household population that had more than four adults. If a sampled household had more than four adult household members, following the preference given to the head of the household, and his/her spouse if applicable, the remaining interview targets (2 or 3 depending on the presence of a spouse) were selected at random from the remaining pool of adult household members.

[15] For more information on the organization and implementation of the individual-disaggregated data collection as part of the T5/IHPS, please consult the survey's basic information document, which can be accessed here: https://microdata.worldbank.org/index.php/catalog/2939/download/47216.

[16] Parcel is defined as a continuous piece of land which can have more than one plot and is referred to as "Garden" in the questionnaires for the T1/IHS4 and the T5/IHPS.

[17] In this process, the enumerator for each individual interview in each household copied the parcel roster from the tablet of the primary enumerator assigned to the household into his/her tablet that generated a new questionnaire (under Survey Solutions census mode) for each interview target. To better facilitate the process, the enumerators also had paper booklets of household, parcel, and plot rosters to ensure unique identification of household members and parcels across the individual interviews in the same household.

[18] Our definition of economic ownership is the same as the definition used in the Uganda MEXA Study (Kilic and Moylan, 2016). We do not have data to consider alternative definitions of economic ownership that could have been based on the control of the crop output associated with each parcel.

[19] The T5/IHPS solicited detailed information also on the rights to use as collateral, rent out and make improvements/invest, in line with the theoretical framework put forth by Schlager and Ostrom (1992).

[20] Along with rights/ownership, the T5/IHPS respondents reported on how each parcel was acquired; identified the individuals from whom the asset was inherited or received as a gift, as applicable; and provided the current hypothetical sales value and limited information on their knowledge of asset transactions in their communities.

[21] For the remaining 1.3 percent of households, the reasons for non-completion included (i) refusal due to the already lengthy household interview that had been completed; (ii) refusal due to the request to conduct the interviews in private, and (iii) loss of individual questionnaires due to Android tablet malfunction.

[22] To get a better understanding of the additional costs of implementing individual interviews, the metadata extracted from the Survey Solutions CAPI application allow for the calculation of number of days spent in a given EA. The field teams took an average of 3.37 days to administer the T1/IHS4 questionnaires to 16 households in every T1/IHS4 EA, with one enumerator visiting each household. Conversely, the same field teams took an average of 4.51 days in an T5/IHPS EA to ensure that each available adult household member was interviewed in private by an enumerator of the same sex, and if possible, simultaneously with other interviews in the same household.

demographic and socioeconomic attributes that predict response (and that are also potentially associated with land ownership).[23]

Table 1 shows a within-household success rate breaking down the number of eligible adults versus the number of individual interviews completed. Across all households, regardless of the number of adults, all eligible adults were successfully interviewed 68 percent of the time. The remaining 32 percent of households had more than one adult but failed to interview at least one of them. Given that the household head or their spouse is most likely to be the household member owning or managing assets listed by a household, part of the analysis outlined in Section 4 has a focus on members of the principal couple. Of the 2,477 households included in the individual household sample, 72 percent had a principal couple, and in 75 percent of these cases enumerators managed to interview both the husband and spouse.

We calculate weights to correct for non-response in the T5/IHPS by running a logistic regression of individual response status among adults eligible for individual interviews. The results from the logistic regression are presented in the Appendix Table A1.[24] Subsequently, we (1) take the inverse of the predicted response probability to construct the response weight variable for each T5/IHPS adult household member who has been subject to an individual interview; (2) winsorize the response weights at the top 1 percent to account for potential outliers; and (3) set it equal to 1 for all adults in the T1/IHS4 sample, which includes the most knowledgeable survey respondents and adult household members who were not interviewed by the T1/IHS4. Henceforth, all statistics are weighted using the response weight.

2.3. Descriptive statistics

The scope of the socioeconomic data collection was nearly identical across the T1/IHS4 and the T5/IHPS. All sample households were administered a multi-topic household questionnaire that collected individual-disaggregated information on demographics, education, health, and wage employment, as well as data on housing, food consumption, food and non-food expenditures, food security, non-farm enterprises, access to infrastructure and exposure to shocks, among other topics. The spatial and temporal distributions of survey samples were similar, reflected by the relatively small differences in the shares of T5/IHPS and T1/IHS4 households surveyed in each interview month and survey stratum (Appendix Fig. A1).[25]

AppendixTable A2 also provides sample means for men and women on individual, household, and geographic characteristics across the two surveys that we also control for in the empirical analysis. There are some statistically significant differences across the survey samples, although the magnitudes of these differences are typically not very large (often not more than 5–7 percentage points across the two survey approaches). Partially driven by non-response in the T5/IHPS individual-level interview set-up, among the adult individuals involved in agriculture residing in T1/IHS4 households there is a greater share of men and women household heads (73 percent of men were household heads in the T1/IHS4, compared to 65 percent of male respondents residing in agricultural households in the T5/IHPS; among women, these shares were 26 and 21 percent, respectively). The T1/IHS4 was also more likely to represent the North region of the country. The T5/IHPS households, while still mostly rural, do have lower share of rural residence vis-a-vis the T1/IHS4 households, with somewhat greater nonfarm employment, ownership of mobile phones, and access to electricity. We control for these individual, household, and geographic characteristics in the regressions below.

Table 1
Distribution of T5/IHPS Households According to Number of Adults Interviewed.

	Panel Total	%
Households Interviewed	**2477**	
All Eligible Adults Interviewed	**1675**	**68%**
4 adults	115	5%
3 adults	225	9%
2 adults	1003	40%
1 adult	332	13%
Subset of Eligible Adults Interviewed	**802**	**32%**
3 out of 4	106	4%
2 out of 4	92	4%
1 out of 4	29	1%
2 out of 3	167	7%
1 out of 3	65	3%
1 out of 2	343	14%
Average # of Adults Interviewed	**1.89**	

On agricultural land ownership and rights, both surveys allow us to compute *individual-level* indicators related to (i) reported ownership, (ii) documented ownership, (iii) economic ownership, (iv) right to bequeath, and (v) right to sell, in a way that *aggregates* the information reported at the parcel-level. In other words, in the T5/IHPS, self-reporting adult household members are tagged as reported owners if they report themselves as a reported owner for at least one agricultural parcel. In the case of the T1/IHS4, adult household members are tagged as a reported owner if they are listed by the most knowledgeable household member(s) as a reported owner for at least one agricultural parcel. All indicators of interest are dichotomous in nature, and separate versions capturing exclusive versus joint ownership/rights are too part of our analysis, as detailed below. The indicators on documented ownership are not included in the analysis as the incidence is so low - only one percent of men and women across both surveys responded that they were documented owners of any agricultural parcel – however, the collection of data and results for documented ownership are still critical for the SDG 5.a.1. definition of ownership.[26]

Furthermore, although different combinations of ownership and rights are possible, Fig. 1 shows that individuals are either likely to have both reported and economic ownership over any parcel, or neither — as opposed to having reported (but not economic) ownership or vice-versa. Similarly, individuals with reported/economic ownership for the most part either had rights to both sell and bequeath land, or rights to neither, although about 10–12 percent of men and women reported rights to bequeath, but not sell a

[23] Among the eligible men who did not respond, 44 percent were heads of household and 35 percent were children of the household head, and among the non-responding women, only 6 percent were household heads, 32 percent were spouses of the head, and 37 percent were children.

[24] Van den Broeck and Kilic (2019) use a similar approach to correct for attrition bias in panel data samples, in a study of labor market dynamics in Sub-Saharan Africa. Our right-hand-side predictors of "response" include (i) fixed effects for districts, interview months and enumerators, (ii) individual covariates, including age; a dichotomous variable identifying women; a series of dichotomous variables on educational attainment; dichotomous variables identifying whether the individual is currently married, and separately, whether he/she is head/spouse of head; and individual's number of months living away from the household over the past year; and (iii) household covariates, including household size, dependency ratio, and a factor analysis based index of improved dwelling attributes and household ownership of durable goods.

[25] There were six survey strata, by region (North/Central/South) and within each region, by urban/rural.

[26] Individuals, within or outside the household, who were reported to be listed on a given ownership document, if any, were identified uniquely on the questionnaire, and the enumerators requested to see the referenced ownership document to cross-check the reporting regarding the documented owners. Conditional on reporting documented ownership, the respondents produced the ownership document for the enumerator<40 percent of the time.

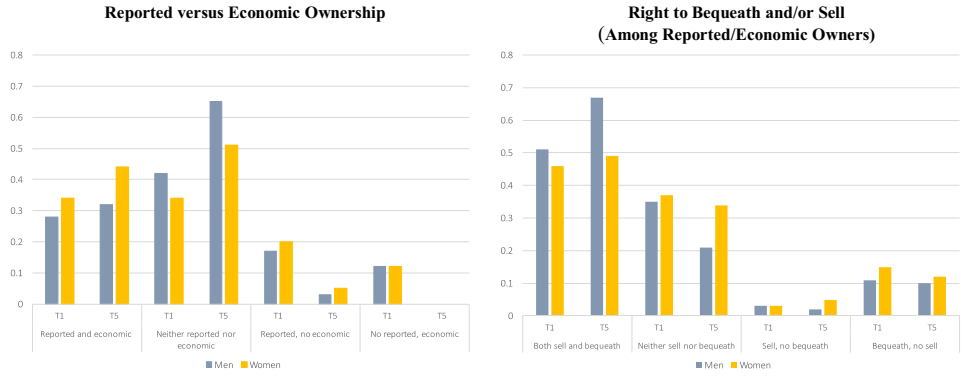

Fig. 1. Bundles of Ownership/Rights among Individuals, by Survey Approach (T1/IHS4 vs T5/IHPS) and Gender. Notes: (1) The sample is comprised of individuals 18 and older, and of those involved in agriculture. The agricultural parcels underlying the (individual level) indicator definitions are those that are associated with the reference rainy season. (2) The rights related variables are defined irrespective of the reported need to obtain consent/permission from anyone – a topic that the T5/IHPS collected additional information on. (3) The graphs are near-identical if the sample is limited only to men in male-headed households.

parcel, across both survey approaches. In separate tabulations, less than one percent of individuals were tagged as having the right to sell/bequeath in either survey if they were not either reported or economic owners of any parcel. Thus, even though the business-as-usual approach in the T1/IHS4, as discussed earlier, allowed for reporting of rights independent of ownership, this difference across surveys does not appear to matter. In separate results, the share of men and women with all ownership and rights — reported and economic, as well as rights to bequeath and sell — was 19 percent of men and 18 percent of women for the T1/IHS4 and 23 percent for men and women in the T5/IHPS. The difference in the estimates for men (women) in the T1/IHS4 versus the T5/IHPS is statistically significant.

Table 2 presents summary statistics on variables capturing exclusive versus joint ownership and rights, along with a dichotomous variable, namely *SDG* Owner, based on the definition of the SDG indicator 5.a.1. The latter takes the value one if the individual is a documented owner, has the right to sell, or has the right to bequeath related to any parcel that the individual interview targets in each given household could have reported on. Means of ownership/rights are broken out by women and men overall, as well as women heads/non-heads of household. As compared to women where there was greater diversity in household status by head, spouse, or other household members, nearly all of men reporting ownership were household heads. We discuss implications of this finding further below. Among the "most knowledgeable" respondents in the T1/IHS4 parcel data who reported on household members' land ownership under the business-as-usual approach, 96 percent of men respondents were household heads, compared to 49 percent of women respondents (Appendix Table A3a).[27] Within the T5/IHPS, there was more variation, but headship among men respondents was still high – 73 percent, compared to 23 percent of women respondents.

In Table 2, adjusted Wald tests for equality of means were also conducted across survey approaches, within the samples of women/men, with significant differences indicated in bold. Columns (9)-(12) conduct the same test on whether differences across men and women, within each survey, are statistically significant (indicated by asterisks). We find that the choice of survey approach primarily affects reporting of exclusive as opposed to joint ownership, as well as joint rights to sell/bequeath (with the exception of women household heads, where the survey approach primarily affects exclusive rights, likely because their households have fewer adult household members).

Specifically, the business-as-usual approach leads to a significantly higher share of men reporting exclusive reported ownership (columns 7–8), as well as the share of women heads of household (columns 1–2). Within the business-as-usual approach, nearly all (95 percent) of women household heads responded for themselves. The business-as-usual approach also leads to a higher share of men claiming exclusive economic ownership, as well as for women who are not household heads (indicated as "non-HH heads" in Table 2) but leads to a lower share of exclusive economic ownership claimed among women heads of household.

Fig. 2 sheds additional light on the age profile of men and women with different ownership and rights. Age is particularly important since asset ownership and rights are often associated with marital status, as well as employment opportunities, which are highly age-dependent. For women heads in particular, Fig. 2 (focused on own-reporting) shows wider positive effects of the business-as-usual approach on exclusive reported ownership among younger groups<50 years, while the negative effects on exclusive economic ownership tend to be focused on older women aged 50–60 (about 15 percent of the sample). Under the business-as-usual approach, joint rights to sell/bequeath are also significantly higher for both men and women (the latter driven by women non-heads). In Section 3, we explore what may be driving these differences across the two surveys, controlling for individual, household, and geographic characteristics in Table A2.

Table 2 also examines how the choice of survey approach affects gender gaps in reporting of ownership and rights. Consistent with matrilineal traditions in Malawi, Table 2 shows that women overall are more likely than men in both surveys to report exclusive ownership/rights (columns 9–10), with this difference widening under the individual interview approach. Among non-household head women, for whom exclusive reported ownership is lower than men in the business-as-usual approach, individual interviews also flip the gender gap in favor of this sub-sample of women (columns 11–12), and also leads to a higher share claiming exclusive economic ownership, as well as exclusive rights to sell/bequeath, relative to men.

Fig. 3 looks more closely at how gender gaps between men and non-household head women vary by age. Individual interviews lead to higher estimates of women's exclusive reported ownership compared to men, among women<60 years old (about 88 percent of the sample). Women's exclusive economic ownership is higher under both the business-as-usual and individual interview

[27] Appendix Table A3b also presents OLS regressions on correlates of the "most knowledgeable" respondent in the IHS4, showing that household headship is highly correlated with being the selected respondent, across both samples of women and men (and for the combined sample, women household heads were significantly more likely to be selected). Spouses were also significantly likely to be surveyed as the main respondent in the T1/IHS4, although to a lesser extent compared to household heads.

Table 2
Means of Ownership and Rights, by Survey Approach (T1/IHS4 vs T5/IHPS) and Gender.

	Samples of men and women reporting involvement in agriculture; statistically significant differences across T1 and T5 (p<0.05) in bold								**Difference in share of (women-men) with ownership/rights [5]**			
	Women (HH Heads)		**Women (Non-HH Heads)**		**All Women**		**All Men**		**All Women vs. All Men**		**Women (only non-HH heads) vs. All Men**	
	(1) T1: IHS4	**(2) T5: IHPS**	**(3) T1: IHS4**	**(4) T5: IHPS**	**(5) T1: IHS4**	**(6) T5: IHPS**	**(7) T1: IHS4**	**(8) T5: IHPS**	**(9) IHS4: cols. (5)-(7)**	**(10) IHPS: cols. (6)-(8)**	**(11) IHS4: cols. (3)-(7)**	**(12) IHPS: cols. (4)-(8)**
Reported own.												
Total	**0.85**	**0.69**	0.43	0.43	**0.54**	**0.48**	**0.45**	**0.35**	0.09***	0.13***	-0.02**	0.08***
	[0.35]	**[0.46]**	[0.50]	[0.50]	**[0.49]**	**[0.50]**	**[0.50]**	**[0.48]**				
Exclusive	**0.80**	**0.63**	0.22	0.24	0.37	0.33	**0.27**	**0.18**	0.10***	0.15***	-0.05***	0.06***
	[0.40]	**[0.48]**	[0.41]	[0.43]	[0.48]	[0.47]	**[0.44]**	**[0.38]**				
Joint	0.07	0.08	0.23	0.23	0.19	0.19	0.20	0.20	-0.01***	-0.01	0.03***	0.03***
	[0.25]	[0.27]	[0.42]	[0.42]	[0.40]	[0.40]	[0.40]	[0.40]				
Economic own.												
Total	**0.47**	**0.62**	**0.45**	**0.39**	0.46	0.44	**0.41**	**0.32**	0.05***	0.12***	0.04***	0.07***
	[0.50]	**[0.49]**	**[0.50]**	**[0.49]**	[0.50]	[0.50]	**[0.49]**	**[0.47]**				
Exclusive	**0.37**	**0.44**	**0.14**	**0.11**	0.20	0.18	**0.12**	**0.08**	0.08***	0.10***	0.02***	0.03**
	[0.48]	**[0.50]**	**[0.35]**	**[0.31]**	[0.40]	[0.38]	**[0.33]**	**[0.28]**				
Joint	0.11	0.21	0.33	0.30	0.27	0.29	0.30	0.26	0.03***	0.03	0.03***	0.04***
	[0.31]	[0.41]	[0.47]	[0.46]	[0.44]	[0.45]	[0.45]	[0.44]				
Right to sell												
Total	**0.52**	**0.41**	0.26	0.22	**0.32**	**0.26**	**0.32**	**0.24**	0.00	0.02	-0.06***	-0.02
	[0.49]	**[0.49]**	[0.44]	[0.41]	**[0.47]**	**[0.44]**	**[0.46]**	**[0.43]**				
Exclusive	**0.49**	**0.39**	0.14	0.17	0.23	0.22	0.22	0.20	0.01*	0.01	-0.08***	-0.03
	[0.50]	**[0.49]**	[0.35]	[0.38]	[0.42]	[0.41]	[0.41]	[0.40]				
Joint	0.04	0.03	**0.12**	**0.06**	**0.10**	**0.06**	**0.11**	**0.06**	-0.01***	-0.01	0.01***	0.00
	[0.50]	[0.16]	**[0.32]**	**[0.24]**	**[0.29]**	**[0.23]**	**[0.31]**	**[0.24]**				
Right to bequeath												
Total	**0.63**	**0.47**	**0.32**	**0.25**	**0.40**	**0.29**	**0.36**	**0.27**	0.04***	0.02	-0.04***	-0.02
	[0.48]	**[0.50]**	**[0.47]**	**[0.43]**	**[0.49]**	**[0.46]**	**[0.48]**	**[0.44]**				
Exclusive	**0.59**	**0.45**	0.17	0.20	0.28	0.25	0.22	0.20	0.06***	0.06*	-0.05***	0.00
	[0.49]	**[0.50]**	[0.37]	[0.40]	[0.45]	[0.43]	[0.42]	[0.40]				
Joint	0.05	0.04	**0.16**	**0.07**	**0.13**	**0.06**	**0.15**	**0.08**	-0.02***	-0.02**	0.01***	-0.01*
	[0.21]	[0.19]	**[0.37]**	**[0.25]**	**[0.34]**	**[0.24]**	**[0.36]**	**[0.28]**				
SDG owner [3]	**0.66**	**0.50**	**0.34**	**0.28**	**0.42**	**0.32**	**0.38**	**0.28**	0.04***	0.04*	-0.04***	0.00
	[0.50]	**[0.50]**	**[0.48]**	**[0.45]**	**[0.49]**	**[0.47]**	**[0.49]**	**[0.43]**				
Observations	**3,099**	**511**	**8,863**	**1,707**	**11,962**	**2,218**	**10,066**	**1,721**				

Notes:

(1) The sample is comprised of individuals 18 and older, and of those reporting involvement in agriculture. The estimates are weighted by the response weight. The agricultural parcels underlying the (individual level) indicator definitions are those that are associated with the reference rainy season.
(2) As compared to women respondents where there was greater diversity in household status by head, spouse, or other household members, nearly all of men respondents in this module were household heads. As a result, for the purposes of this table, all men were considered together.
(3) The rights-related variables are defined irrespective of the reported need to obtain consent/permission from anyone – a topic that the T5/IHPS collected additional information on.
(4) SDG owner is equal to 1 if the individual is a documented owner of any parcel or has the rights to sell or bequeath any parcel, and 0 otherwise.
(5) Standard deviations in brackets. Adjusted Wald tests for equality of means were also conducted across T1 and T5, within the samples of women/men. Statistically significant differences (p < 0.05) are in bold; all except two tests within the sample of women who are not household heads (exclusive economic ownership and SDG owner) were statistically significant at p < 0.01.

***=p < 0.01, **=p < 0.05, *=p < 0.10.

Table 3
Spousal Agreement/Discrepancies in Ownership and Rights of Agricultural Parcels in T5/IHPS.

(a) Reported ownership

		Wife			
		H	**J**	**W**	**No**
Husband	**H**	**14.0**	5.5	1.5	
	J		**9.7**	5.2	7.9
	W			**22.7**	
	No		9.0		**24.6**
	Share agree: 71%, Share disagree: 29%				

(b) Economic ownership

		Wife			
		H	**J**	**W**	**No**
Husband	**H**	**4.7**	2.1	0.2	
	J		**13.1**	1.4	18.0
	W			**9.0**	
	No		20.5		**31.1**
	Share agree: 57.9%, Share disagree: 42.1%				

(c) Right to sell

		Wife			
		H	**J**	**W**	**No**
Husband	**H**	**21.1**	2.0	1.2	
	J		**0.9**	1.3	4.9
	W			**19.6**	
	No		2.3		**46.7**
	Share agree: 88.3%, Share disagree: 11.7%				

(d) Right to bequeath

		Wife			
		H	**J**	**W**	**No**
Husband	**H**	**21.3**	3.2	1.6	
	J		**1.2**	2.1	5.5
	W			**20.2**	
	No		2.1		**42.9**
	Share agree: 85.6%, Share disagree: 14.4%				

Notes: The findings are based on 1,719 parcel observations and the responses that were provided by 931 couples, about 55.5 percent of which had more than one parcel. H = Owned by Husband, J = Jointly Owned, W = Owned by Wife; "No" = Reported No Ownership or Rights.

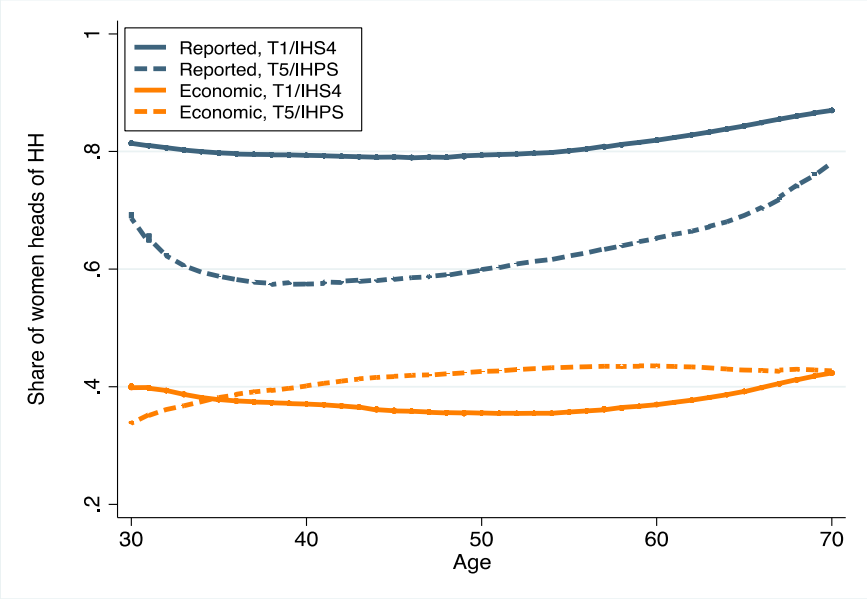

Fig. 2. Exclusive Reported and Economic Ownership Among Self-Reporting Women Household Heads, by Survey Approach (T1/IHS4 vs T5/IHPS) and Age. Notes: (1) The sample is comprised of self-reporting women heads 18 and older, involved in agriculture. (2)The median age for women household heads was 46 years, and 20 percent of this sample was between 60 and 75 years. (3) The agricultural parcels underlying the (individual level) indicator definitions are those that are associated with the reference rainy season.

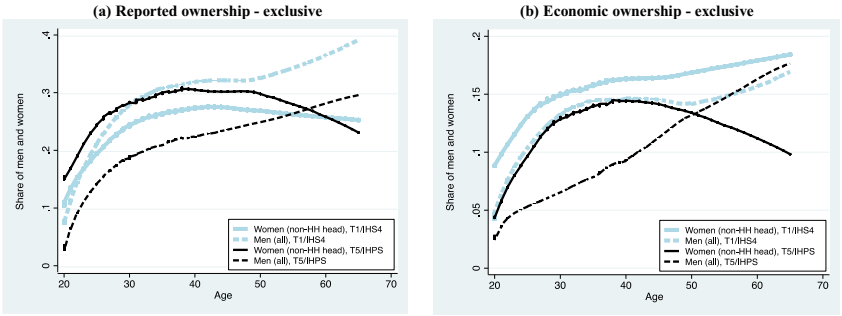

Fig. 3. Non-Household Head Women vs. Men Overall: Reversal/Narrowing of Gender Gaps in Exclusive Land Ownership/Rights under Individual Interviews (T5/IHPS).

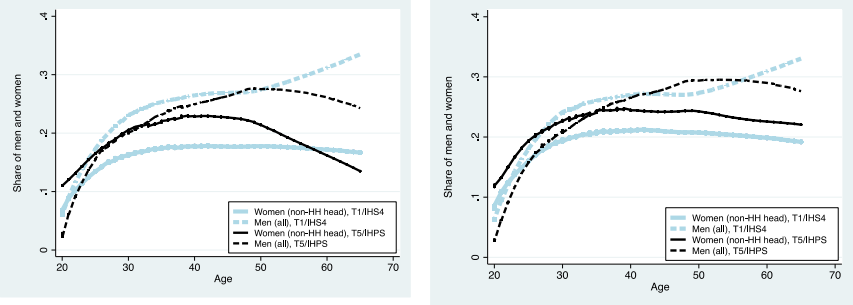

Fig. 3 (*continued*)

approaches, but the reverse gender gap is much greater under individual interviews. Individual interviews also narrow gender inequalities in rights, particularly among younger men and women. Gender inequalities do widen again in ownership and rights under both survey approaches for older, non-household head women — also compared to high reported/economic land ownership for women heads — indicating that the effect of survey approach may be particularly high for this group.

3. Empirical strategy

This section describes the empirical framework for estimating relative survey treatment effects that the concurrent implementation of T1/IHS4 and T5/IHPS can isolate. Since the focus of the analysis is on ownership/rights over agricultural land, and in part on the SDG indicator 5.a.1, the reference population is adult individuals living in agricultural households, who have owned or cultivated land for agricultural purposes and/or raised/tended livestock in the past 12 months, regardless of the final destination of production.

As noted above, the T1/IHS4 sample includes all the adult household members, among whom owners and right holders for at least one agricultural parcel is determined based on the reporting of the most knowledgeable household member(s). Conversely, the T5/IHPS sample includes only the adult household members that were subject to individual interviews. Within this sample, an individual would have been identified as an owner or a right holder if they self-reported as such for at least one agricultural parcel.[28]

The core specification is estimated for the total sample of adult household members, and separately, for the sub-populations of men and women as:

$$y_{ih} = \propto + \beta_1 \tau T_{1ih} + \gamma C + \varepsilon_{ih} \quad (1)$$

where i and h represent individual and household, respectively; y is the binary dependent variable on whether the individual has ownership/rights (detailed in Table 2) over any agricultural parcel in the household; α and ε represent constant and error terms, respectively. $T_1$is a binary variable identifying the T1/IHS4 sample, with the T5/IHPS sample constituting the comparison category for this variable. C is a vector of individual, household and community attributes, along with fixed effects for interview month and enumerators, to capture any remaining unobserved heterogeneity that may also jointly determine both the dependent variable and household assignment to the T5/IHPS versus the T1/IHS4 (summary statistics for these variables are presented in Appendix Table A2).[29]

Given the dichotomous nature of the dependent variables, equation (1) is estimated as a linear probability model with weights adjusting for non-response.[30] The T5/IHPS sample is used as the comparison category in equation (1) as it represents the internationally-recommended approach to data collection on asset ownership and rights. Standard errors are clustered at the EA-level, and the regressions are weighted using the response weight variable, as described in Section 2.2.

4. Results

4.1. Comparing the T1/IHS4 and T5/IHPS: (Individual-Level) ownership and rights over agricultural land

Table 4 presents a summary table of the estimates of the coefficient β_1 from equation (1) (i.e. the effect of following the business-as-usual approach to respondent selection vis-à-vis conducting individual interviews) – derived from the regressions that are estimated on the whole, and separately for men and women sub-samples, and for a range of ownership and rights constructs as the dependent variables. We show that under the business-as-usual approach, the shares of men claiming exclusive reported and economic ownership of agricultural land are higher, while the shares of women claiming joint reported and economic ownership of agricultural land are lower. The effect on the joint reported ownership among men is also negative, albeit significant only at the 10 percent level. On the other hand, the business-as-usual approach to respondent selection leads to an increase in rights to sell and bequeath for both men and women, driven by a positive effect on reporting of joint rights (as reflected above in Table 2). The effects on these outcomes under the business-as-usual approach is driven by a combination of interviewing the most knowledgeable household member, as well as allowing rights holders to be specified in the questionnaire irrespective of how they answered on reported parcel ownership, as noted in section 2.2.[31] Since documented agricultural land ownership is near-negligible in Malawi, the estimate of the SDG indicator 5.a.1 is

[28] We gauged the sensitivity of our findings by (i) expanding the analysis sample to include adults from non-agricultural households, and (ii) restricting the analysis sample only to adults who were personally engaged in agriculture (as opposed to simply living in an agricultural household). The resulting differences in our estimates were negligible, and we wanted to be in line with the international standards.

[29] In addition to controlling for respondent's sex, individual covariates in C include household headship status; categorical variables for age and marital status; highest educational level attained; whether the respondent was engaged in different types of non-farm employment (ran/helped in NFE in last 12 months, salaried or casual wage labor); whether the respondent suffers from a chronic illness; and whether the respondent has a mobile phone. Household covariates in C include age/sex composition of other household members; household size; language of the HH head; whether the HH faced any income/asset shock; as well as HH access to electricity and piped water.

[30] Our estimates were similar to the marginal effects derived from Probit regressions, which are available upon request.

[31] The data do not allow us to disentangle these effects.

Table 4
Effect of Business-As-Usual Survey Approach (T1/IHS4) on Agricultural Land Ownership and Rights.

		N	**Reported**			**Economic**		
Sample			*Overall*	*Exclusive*	*Joint*	*Overall*	*Exclusive*	*Joint*
All adults	*Overall*	25,967	0.017	0.052***	−0.050***	−0.017	0.022**	−0.045**
			[0.96]	[4.12]	[−3.18]	[−0.91]	[2.50]	[−2.55]
	Men	11,787	0.064**	0.087***	−0.037*	0.014	0.038***	−0.024
			[2.44]	[4.74]	[−1.71]	[0.54]	[3.53]	[−0.92]
	Women	14,180	0.001	0.015	−0.031**	−0.020	0.004	−0.033*
			[0.02]	[0.81]	[−2.11]	[−0.92]	[0.28]	[−1.91]
		SDG Owner	**Sell**			**Bequeath**		
Sample		*Overall*	*Overall*	*Exclusive*	*Joint*	*Overall*	*Exclusive*	*Joint*
All adults	*Overall*	0.052***	0.036***	0.001	0.030***	0.051***	0.007	0.038***
		[3.07]	[2.66]	[0.11]	[4.10]	[3.02]	[0.56]	[4.14]
	Men	0.054**	0.037	−0.004	0.039***	0.039	−0.006	0.037***
		[2.09]	[1.64]	[−0.22]	[3.95]	[1.52]	[−0.28]	[2.63]
	Women	0.062***	0.042***	−0.004	0.039***	0.068***	0.004	0.060***
		[3.36]	[2.75]	[−0.28]	[5.05]	[3.73]	[0.23]	[6.16]

Notes:

(1) The sample is comprised of individuals 18 and older, and just of those involved in agriculture. The results are from linear probability models, weighted by the response weight. ***=p < 0.01, **=p < 0.05, *=p < 0.10. T-statistics are presented in brackets, and account for clustering at the enumeration area level.

(2) SDG owner is equal to 1 if the individual is a documented owner of any parcel or has the rights to sell or bequeath any parcel, and 0 otherwise.

primarily dependent on rights to sell and bequeath. As a result, with the strong treatment effects on the latter two rights, the SDG owner estimate is also significantly positive under the business-as-usual approach for both men and women.

Aside from differences in survey design, one potential reason for higher exclusive ownership claimed among men in the business-as-usual approach is the association between headship and land ownership/rights. Among all age-eligible adults, men having ownership or rights across survey approaches are almost always household heads (Fig. 4), in contrast to women with ownership/rights whose household status is more varied. And, as discussed earlier, the share of male household heads overall is significantly higher in the T1/IHS4 sample.

The effects of other control variables on reported ownership are presented in full regression results in Appendix Table A4a (similar associations of controls were found for economic and SDG ownership, presented in Appendix Table A4b). There were some similarities across men and women — with older age groups more likely to report ownership, similar effects of household composition, and indications that improved income/household infrastructure had lower association with agricultural land ownership (negative effect of salaried work and household electrification/access to piped water, and positive effects of casual wage work with joint ownership). There were gender differences in other key areas, however. Men household heads, for example, were more likely to report exclusive or joint ownership, while women household heads were more likely to report exclusive ownership, but less likely to be joint owners (reflecting different types of households/household demographic profiles). As discussed in Table 5 below, interacting the headship variable with the business-as-usual survey approach reveals further differences in reported/economic ownership across men/women heads of household.

There were gender differences across other variables as well (across women's education and work in a nonfarm enterprise, as well as the effects of marital status and mobile phone ownership for men) that underscore the importance of understanding local context and opportunities on men's and women's ownership and rights. We also found that negative shocks experienced in the last 12 months were linked with lower estimates of women's exclusive land ownership but were positively associated with men's exclusive ownership. This is similar to findings in the literature on how men's and women's reported asset ownership varies by experience to negative shocks (Quisumbing et al., 2018, provide evidence from Bangladesh and Uganda).[32] One reason may be because of differences in how men- versus women-owned assets are drawn down to cope with these events; women's landholdings are smaller or less productive, for example, and so more likely to be sold off in the event of a negative shock.

To better understand the effects of survey approach on specific sub-groups, Table 5 presents the results from the estimation of a modified equation (1), augmented with the interactions between the T1/IHS4 identifier and a subset of controls that are closely related to household structure and land ownership, including individual headship, age (whether the individual is younger than 25, compared to all other adults), marital status, education, rural residence and variables on household composition.

While household heads overall tend to report higher exclusive ownership and rights (Appendix Tables A4a-b), Table 5 shows the business-as-usual approach leads to lower reporting of economic ownership among women heads as compared to reported ownership, as seen earlier across Table 2 and Fig. 2 as well. For other effects, Table 5 shows relatively similar patterns across reported and economic ownership. On land ownership, across age (being younger than 25), marital status (relative to married couples, being separated/divorced or never married), and education, we see that the business-as-usual approach leads to higher estimates of exclusive ownership among men and women. On the other hand, being widowed or living in a larger household with more dependents (greater share of children and women aged 65 +) reflects lower reporting of exclusive ownership/greater reporting of joint ownership under the business-as-usual approach. Interaction effects of the business-as-usual approach also tend to be stronger for men overall, including a positive effect on both men's exclusive reported and economic ownership in rural areas.

Regarding *SDG Owner*, on the other hand, Table 5 shows that the interaction effects take on statistically significant coefficients more so among women. Noteworthy are the positive interaction effects associated with headship (related mainly to exclusive rights to

[32] Their study also looks at how reporting across different classes of assets (land, livestock, productive equipment, jewelry) varies by different types of shocks — illness, natural disasters, etc.

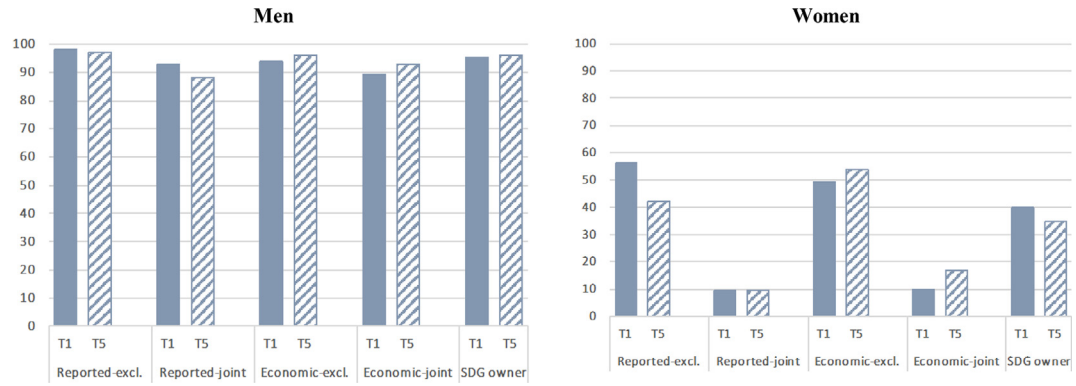

Fig. 4. Incidence of Headship Among Owners, by Survey Approach (T1/IHS4 vs. T5/IHPS) and Gender. Notes: Non-household heads owning land were primarily spouses of the household head.

sell/bequeath) and share of men aged 65 + in the household (related mainly to a higher share claiming joint rights) as well as negative interaction effects associated with being younger, separated/divorced, and more educated (again mainly due to joint rights). For men, the only significant interaction effect is associated with the share of women aged 65 + in the household (significant negative effect, due to a lower share with exclusive rights).[33]

Overall, we find that compared to individual interviews, the business-as-usual approach leads to a higher share of respondents claiming exclusive reported and economic ownership, driven mainly by men household heads. For women household heads, on the other hand, the choice of survey approach matters more (higher reported ownership in the business-as-usual approach, but higher economic ownership under individual interviews). We also find that the (positive) interaction effects between the business-as-usual survey approach and variables on marital status, age, and rural residence tend to be stronger for men (and in particular regarding exclusive as opposed to joint land ownership).

4.2. Uncovering complexities within the T5/IHPS: (Parcel-Level) Intra-household disrepancies in reporting, and discrepancy analysis

Within the individual interview approach, however, there can be additional measurement issues. Self-reported data, with potential heterogeneity in how respondents interpret and answer questions on ownership and rights, can result in diverging intra-household reports regarding the same parcel, particularly in settings where documented land ownership is not prevalent.[34] Disagreement among women and men in the household can also stem from cognitive factors. These include different interpretations of the concept of "joint" ownership (Jacobs and Kes, 2015, in a study on South Africa and Uganda); as well as how ownership roles are distinguished from actual decision-making over land use (Kang et al., 2020, who in a study on Malawi and Ethiopia find that men often continue to report sole-decision making over planting on jointly-owned plots).[35] In the absence of a strategy that unquestionably resolves discrepancies, the fallback option in the prior work, as in ours, has been to accept each person's response as to whether they are an owner of a given asset.

Within the T5/IHPS sample, the administration of individual interviews using a common roster of agricultural parcels permits the examination of possible discrepancies in spouses' reported ownership/rights for specific agricultural parcels. Focusing on the subsample of T5/IHPS households in which the members of the principal couple were both interviewed, we find that the majority of couples within the individual-interview approach do agree on ownership and rights over parcels (Table 3).[36] The share of parcels where spouses agree is 71 percent for reported ownership, 58 percent for economic ownership, 88 percent for the right to sell, and 86 percent for the right to bequeath.[37] Where discrepancies over reported/economic ownership occur in the T5/IHPS, it typically involves one spouse claiming joint ownership (and in this case, the other claiming no ownership). There are very few cases of disagreement where each spouse claims they are the exclusive owner/have exclusive rights.

The findings in Table 3 indicate relative consistency among spouses' reporting on parcels within the individual-interview approach. In more recent LSMS + supported surveys with the same survey modules and fieldwork protocols as the T5/IHPS, agreement over ownership and rights to land was also higher — around 90 percent of non-dwelling parcels in Ethiopia, 75 percent in Tanzania, and 95 percent in Cambodia 2019/20.[38] Results may vary across countries, however, due to different norms and practices that affect how men and women report land ownership and rights. Unlike Malawi, for example, a higher share of disagreement wasn't observed for economic as opposed to reported ownership in these other country surveys. Spousal agreement was also lower for MEXA T5, for example, where the comparable estimates for parcel-level agreement on reported owners and economic owners were 45 percent and 48 percent, respectively.

How relevant are intra-household agreement and disagreement for understanding women's and men's socioeconomic outcomes

[33] The results for exclusive/joint rights are available upon request.

[34] "Even with the documentation, the intra-household truth regarding who exerts control over a given asset may not line up with which household members are listed in the records as owners" (Doss et al, 2019: 22) due to (i) lags in the updating of cadastral records following inter-personal parcel transfers, (ii) temporal variation in intra-household control of the parcel in question and (iii) the potential disconnect between *de jure* legislation (prohibiting gender discrimination in ownership and rights over land) and local *de facto* arrangements that may prevail over state laws and that may result in gender discrimination in a way that exhibits spatial variation in accordance with social norms.

[35] Kang et al. (2020) use data from the Ethiopia Socioeconomic Survey (ESS) 2015/16 and Malawi IHS4 2015/16.

[36] Documented ownership is almost negligible, with husbands and wives agreeing 98 percent of the time that they do not have an ownership document for the parcel in question.

[37] The country pilots that had been supported by the EDGE initiative had presented substantial agreement among couples (83 percent in Georgia and Mongolia, 90 percent in the Philippines), although this was regarding dwelling as opposed to agricultural land (United Nations, 2019).

[38] The share of agreement over dwelling land was also similar across countries. The estimates are based on author calculations using the data from the LSMS+ supported surveys. While the data from the Ethiopia Socioeconomic Survey 2018/19 are publicly available through the World Bank Microdata Library, the data from Tanzania National Panel Survey 2019/20 and Cambodia Socioeconomic Survey 2019/20 are expected to be disseminated in the first half of 2021.

Table 5
Interactions of Business-As-Usual Survey Approach (T1/IHS4) with Individual and Household Attributes.

	Men				Women				
	Reported		Economic		SDG Owner	Reported	Economic		SDG Owner	
	Exclusive	Joint		Exclusive	Joint		Exclusive	Joint		Exclusive	Joint
	(1)	(2)		(3)	(4)	(5)	(6)	(7)		(8)	(9)	(10)
T1/IHS4	0.024	0.027		0.080*	0.085	0.018	0.017	0.001		0.026	−0.005	0.035
	[0.46]	[0.40]		[1.67]	[1.25]	[0.24]	[0.32]	[0.03]		[0.64]	[−0.08]	[0.61]
HH head	0.204***	0.138***		0.113***	0.227***	0.279***	0.291***	−0.162***		0.257***	−0.109***	0.109***
	[6.44]	[4.59]		[3.96]	[6.32]	[7.39]	[9.46]	[−6.83]		[7.98]	[−3.45]	[3.51]
HH head*T1	0.074**	0.024		−0.049	−0.054	0.049	0.166***	0.028		−0.092**	−0.107***	0.089**
	[2.15]	[0.73]		[−1.57]	[−1.43]	[1.21]	[4.96]	[1.08]		[−2.57]	[−3.19]	[2.58]
Age 18–24	−0.084***	0.011		−0.068***	−0.023	−0.09***	−0.10***	−0.115***		−0.089***	−0.102***	−0.158***
	[−3.28]	[0.36]		[−4.17]	[−0.80]	[−2.74]	[−3.95]	[−4.24]		[−5.15]	[−3.78]	[−6.18]
Age 18–24*T1	0.052*	−0.099***		0.032*	−0.062**	−0.027	−0.022	−0.001		0.032*	−0.037	−0.058**
	[1.94]	[−3.21]		[1.78]	[−1.99]	[−0.87]	[−0.92]	[−0.05]		[1.76]	[−1.30]	[−2.15]
Separated/ divorced	0.045	−0.048		0.076	−0.099*	0.002	−0.060*	−0.062**		0.028	−0.136***	0.012
	[0.84]	[−0.84]		[1.56]	[−1.81]	[0.02]	[−1.76]	[−2.41]		[0.99]	[−3.70]	[0.33]
Separated/ divorced*T1	0.178***	−0.101*		0.039	−0.112*	0.053	0.079**	−0.04		−0.037	0.025	−0.071*
	[2.85]	[−1.69]		[0.66]	[−1.92]	[0.67]	[2.14]	[−1.41]		[−1.14]	[0.65]	[−1.70]
Widowed	0.299***	−0.042		0.398***	−0.179***	0.116	−0.007	−0.033		0.029	−0.101**	−0.011
	[2.86]	[−0.50]		[3.48]	[−2.93]	[1.25]	[−0.17]	[−0.94]		[0.80]	[−2.37]	[−0.31]
Widowed*T1	−0.282**	0.061		−0.379***	0.172**	−0.086	−0.026	0.051		−0.005	0.101**	0.02
	[−2.47]	[0.69]		[−3.05]	[2.49]	[−0.83]	[−0.62]	[1.37]		[−0.12]	[2.20]	[0.48]
Never married	0.077**	−0.069		0.084***	−0.057	−0.015	−0.058**	−0.074**		0.017	−0.150***	−0.047
	[2.13]	[−1.61]		[2.86]	[−1.20]	[−0.33]	[−2.07]	[−2.01]		[0.80]	[−3.96]	[−1.31]
Never married*T1	0.114**	−0.078		−0.038	−0.153***	0.06	0.057*	−0.041		−0.023	0.027	0.008
	[2.35]	[−1.60]		[−0.90]	[−2.86]	[1.04]	[1.77]	[−1.06]		[−0.90]	[0.67]	[0.19]
Education: highest level	−0.010*	0.022***		−0.007	0.024***	0.007	−0.007	0.006		−0.008	0.01	0.009
	[−1.81]	[3.18]		[−1.44]	[2.66]	[0.75]	[−0.55]	[0.71]		[−1.07]	[0.80]	[0.80]
Education level*T1	0.008	−0.024***		0.009	−0.027***	−0.008	−0.003	−0.020**		0.003	−0.028**	−0.022*
	[1.27]	[−3.22]		[1.65]	[−2.74]	[−0.81]	[−0.21]	[−2.18]		[0.39]	[−2.32]	[−1.86]
Share children ≤ 14	0.029	0.039		−0.092**	0.051	0	0.115*	−0.028		0.097**	−0.004	0.079
	[0.56]	[0.62]		[−2.25]	[0.97]	[−0.01]	[1.96]	[−0.64]		[1.97]	[−0.09]	[1.53]
Share children ≤ 14 *T1	−0.114**	0.026		0.063	0.024	−0.002	−0.047	0.103**		0.022	0.007	0.024
	[−2.02]	[0.39]		[1.42]	[0.40]	[−0.03]	[−0.76]	[2.19]		[0.42]	[0.13]	[0.44]
Share of men ≥ 65	−0.037	0.061		−0.184***	0.19	0.115	−0.265**	0.034		−0.017	−0.221	−0.374***
	[−0.34]	[0.25]		[−3.31]	[0.85]	[0.50]	[−2.17]	[0.21]		[−0.15]	[−1.59]	[−2.73]
Share of men ≥ 65*T1	−0.103	−0.102		−0.027	−0.139	−0.345	0.039	0.075		−0.039	0.143	0.361**
	[−[−0.81]	[−0.40]		[−0.41]	[−0.57]	[−1.46]	[0.30]	[0.44]		[−0.34]	[0.96]	[2.47]
Share women ≥ 65	0.117	0.456**		0.018	0.381***	0.269**	−0.67***	−0.041		−0.282***	−0.342**	−0.653***
	[0.86]	[2.50]		[0.19]	[2.68]	[1.99]	[−4.50]	[−0.28]		[−2.59]	[−2.03]	[−4.21]
Share women ≥ 65*T1	−0.493***	−0.195		−0.296***	−0.107	−0.295**	0.132	0.027		0.077	0.258	0.184
	[−3.48]	[−1.03]		[−2.95]	[−0.70]	[−2.08]	[0.82]	[0.17]		[0.63]	[1.40]	[1.06]
HH size	−0.013***	0.011		0.002	0.003	−0.004	−0.02***	0.005		−0.010***	−0.001	−0.014***
	[−2.92]	[1.59]		[0.39]	[0.52]	[−0.71]	[−3.52]	[0.93]		[−2.62]	[−0.17]	[−3.30]
HH size*T1	−0.004	−0.006		−0.013***	0.001	−0.005	−0.001	−0.010*		−0.006	−0.001	−0.002
	[−0.80]	[−0.87]		[−2.97]	[0.16]	[−0.85]	[−0.24]	[−1.81]		[−1.44]	[−0.21]	[−0.33]
Rural	0.013	0.042		−0.01	0.080**	0.024	0.046	0.056		0.023	0.05	−0.005
	[0.59]	[1.36]		[−0.63]	[2.46]	[0.67]	[1.58]	[1.54]		[1.01]	[1.33]	[−0.13]

Table 5 (*continued*)

	Men				Women				SDG Owner			
	Reported Exclusive	Joint	Economic Exclusive	SDG Owner Joint	Reported	Economic Exclusive	Joint		Exclusive	Joint		
Rural*T1	0.050**	0.011	0.043**	−0.008	0.051	−0.023	0.004		0.018	0.03		0.057
	[1.99]	[0.33]	[2.34]	[−0.24]	[1.34]	[−0.71]	[0.10]		[0.72]	[0.78]		[1.40]
Observations	11,787	11,787	11,787	11,787	11,787	14,180	14,180		14,180	14,180		14,180
R2	0.179	0.106	0.064	0.105	0.217	0.343	0.102		0.113	0.104		0.179

Notes:
The T1/IHS4 sample is comprised of all adult individuals 18 years of age and older, and of those residing in households involved in agriculture. The T5/IHPS sample is comprised of respondents 18 years of age and older and of those residing in households involved in agriculture. The results are from linear probability models, weighted by the response weight. ***=p < 0.01, **=p < 0.05, *=p < 0.10. T-statistics are presented in brackets, and account for clustering at the enumeration area level.

and status within the household, including decision-making over parcels? Since overall agreement between spouses is relatively high in the T5/IHPS, and thus less variation in the data across agreement/disagreement outcomes (Table 3), regressions looking at associations of individual, parcel, household, and geographic characteristics on overall discrepancies or agreement on reported or economic ownership do not reveal much information (Appendix Tables A5 and A6, respectively). Regressions in Appendix Table A7 do show, however, that specific disagreement scenarios (as opposed to overall disagreement) may reveal more relevant information, among the two scenarios of disagreement over reported and economic ownership that are relatively more common — (1) where the wife reports joint ownership, and the husband reports not owning land, and (2) where the husband reports joint ownership, and the wife reports not owning. The results in Appendix Table A7 show that greater household status for women (household headship, being in matrilineal marriages, and being the main decision-maker over any plot in the household), is negatively associated with (1), and positively with (2) where they attribute some land ownership to themselves. Appendix Table A7 also indicates that wives also tend to discount their ownership relative to husbands with larger parcels. Where present, therefore, intra-household disagreement can also reveal important information relevant for policy targeting, although further exploration is needed in contexts where there is more variation across disagreement outcomes.

Fig. 5 also looks more carefully at how greater decision-making for women in agriculture is associated with different combinations of spouses' reporting over ownership and rights presented in Table 3. Specifically, Fig. 5 plots the share of couples across all decision-making scenarios — by whether women are reported to be the main decision-maker in cropping activities in the agricultural module. Unlike the individual interview module over land, the agricultural modules in the T5/IHPS were answered by one, again "most knowledgeable" member; our aim is just to understand how this indicator of women's status, whether reported by herself or someone else, is associated with intra-household reporting of men's and women's land ownership and rights. Fig. 5 shows that where women are listed as the main decision-maker, couples are much more likely to agree that she is the exclusive reported owner (and, albeit to a lesser extent, economic owner), as well as with exclusive rights to sell and bequeath. Appendix Table A6, which presents regressions for agreement outcomes across reported and economic ownership, also shows similar findings. Similar to the discrepancy results in Appendix Table A7, Fig. 5 shows that women listed as the main decision-makers were also much more likely to be represented in the scenario where the husband reports not owning land, but the wife reports joint ownership Ultimately, then, our findings underscore positive links between decision-making over parcels and intra-household agreement of women's parcel ownership — as well as, in cases of disagreement, where women attribute at least some land ownership to themselves).

5. Conclusions

The results outlined above, based on concurrent, nationally representative surveys from Malawi, highlight how respondent selection can affect levels of ownership and rights constructs across men and women within households. In particular, our findings further bolster the 2019 UN recommendations to expand intra-household data collection on individual-disaggregated asset ownership and control, and to interview adult household members in private regarding their personal ownership and rights over physical and financial assets. Doing so has significant gender implica-

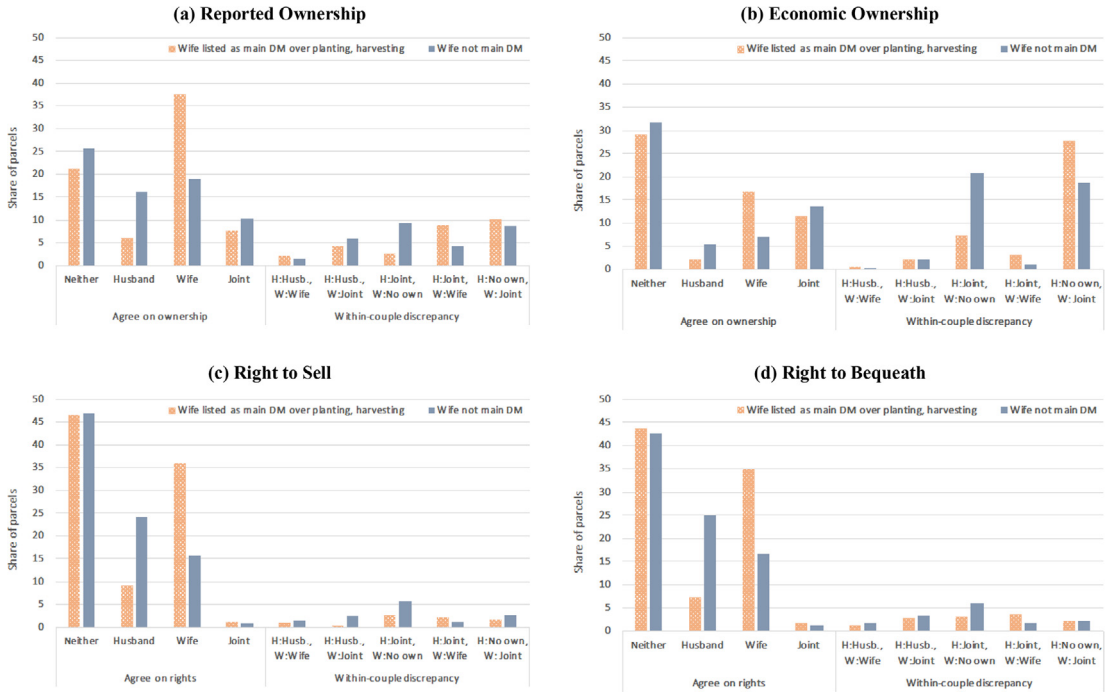

Fig. 5. T5/IHPS: Association between Women's Decision-Making Over Agricultural Parcels, and Agreement/Discrepancy Scenarios over Ownership/Rights. Notes: (1) The sample is comprised of individuals 18 and older, and of those involved in agriculture. (2) Within agreement, differences between the decision-maker (DM) and non-DM columns were statistically significant at $p < 0.01$ for the "Husband" and "Wife" ownership scenarios.

tions. Asking the so-called most-knowledgeable household members on land ownership and rights of other adults, for example, leads to a higher share of men claiming exclusive reported and economic ownership of agricultural land among men, and results in a lower share of women reporting ownership. For younger to middle-age women, we find that the best-practice, private individual interviews also leads to a higher share of women claiming reported and economic ownership (exclusive and joint), as well as rights, relative to men. Further, under individual interviews, we find substantial consistency in reporting/agreement on parcel ownership among married/cohabiting spouses, and where spouses agree on women's ownership, is significantly associated with their decision-making over parcels.

While the findings point to the value of following international best practices in individual-disaggregated data collection on ownership and rights over land, further research is needed on better understanding how men and women within households (and across country/regional contexts) comprehend and interpret survey questions on asset ownership, often due to gender norms and other social customs. Doss et al. (2019), for example, suggest cognitive interviewing pilots in the field to shed light on these issues, as well as on correlates of discrepancies in intra-household reporting on land ownership and rights. In general, this is part of an important area of work on survey question design that should be explored further.

CRediT authorship contribution statement

Talip Kilic: Conceptualization, Methodology, Writing - original draft, Writing - review & editing, Supervision, Project administration, Funding acquisition. **Heather Moylan:** Investigation, Data curation, Writing - original draft, Writing - review & editing, Formal analysis, Project administration. **Gayatri Koolwal:** Data curation, Formal analysis, Writing - original draft, Writing - review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.worlddev.2021.105545.

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